



U.S. Department  
of Transportation

**Federal Highway  
Administration**

# Memorandum

Subject: Uneven Pavement and Edge Drop-Offs  
Work Zone Safety Program Guidance

Date: October 31, 1997

From: Engineering Services Team Leader  
Atlanta, Georgia

Reply to  
Attn. of: HES-04

To: Division Administrators  
Region 4

This replaces the guidance transmitted with the February 27, 1989 memorandum from Mr. Gary Hamby. The new guidance is based on field experience and research conducted since 1989 and is applicable to temporary construction and maintenance operations.

The practice of constructing pavement sections and overlays subject to traffic exposure is common in the highway construction industry. Milling existing surfaces or placing new material often creates an edge that may cause a vehicle to lose control when crossed by a wheel. These uneven pavement surfaces could be within the limits of a single lane or adjacent to travel lanes. Larger hazardous drop-offs may occur outside the travel surface.

## References:

Roadside Design Guide, Section 9.3, January 1996  
1988 MUTCD Part VI Revision 3, September 3, 1993  
A Study of Longitudinal Joint Construction Techniques in  
HMA Pavements, Kandhal and Mallick, NCAT Report #96-3

## Guidelines:

The primary reasons for uneven pavement conditions for resurfacing are the efficiencies of not squaring up a day's paving production or the desire to minimize disruption of traffic patterns. Adding lanes or widening shoulders adjacent to existing pavements typically requires cutting to base material on an in-service pavement and then filling with the new structural layers. Unprotected edge drop-offs are an integral part of this construction process.

Exposure of uneven pavement surfaces, edge drop-offs, and protrusions on pavement surfaces should be avoided when possible. Where it is not practical to eliminate exposure of such conditions, use the attached tables as guidance.

Wedges should be prepared using appropriate materials and compacted so that vehicles can traverse the edge condition safely. Hot or cold asphaltic mixtures should be used for wedge heights of 150 mm or less on bituminous surfaces. Granular materials are recommended for wedges over 150 mm in height not within travel lanes. Construction practices for pavement joints using wedges should conform to accepted practices for joint construction and compaction. A paper by Kandhal and Mallick (NCAT Report No. 96-3) is our recommended guide and is included as an attachment to this document.

Minimum buffer areas are for active work conditions. When work is not under progress in the drop-off area such as overnight or weekend periods, the appropriate temporary wedge should be in place.

We strongly encourage restricting the time and length of exposure of these temporary surface edge conditions and traffic control measures. Appropriate limits of exposure should be based on traffic volume and speed, design geometrics, and relative location of on-coming traffic in addition to the severity of the drop-off.

#### **Traffic Control Devices:**

Appropriate devices and plans should be used in conjunction with the recommended mitigation measures for each edge condition present. Traffic control devices and their placement must be in accordance with the MUTCD Part VI.

Channelizing devices and delineation should be located on the traffic side of any drop-off. Pavement markings should be placed so that wheel paths are as far as practical from elevation changes on uneven lanes. Delineation appropriate for overnight traffic control should be required for any vertical edge over 75 mm and any wedged edge over 115 mm in height.

The work zone safety program and construction processes in Region 4 are coordinated by Mr. Bernie Kuta. He is available for technical assistance with program issues or for consultation on individual projects. Please call upon Bernie at 404-562-3685 any time you need assistance.

Original s/by      Wright Aldrigde

Wright B. Aldridge, Jr., P.E.

Attachments

**Low Speed - less than 50 km/hr (30 mph)**

Location	Elevation Difference	Pavement Surface Edge Mitigation Recommended
All surfaces	75 mm max	None (vertical edge allowed)
	Trenches over 75 mm (includes holes for utilities hookup)	Use steel plates to cover transverse openings or treat longitudinal trenches as drop-offs using wedges with 1:3 or flatter slopes.
	Protrusions (i.e., utility cover or manhole) up to 100 mm max	Provide wedge around the protrusion with 1:12 slope or flatter in the direction of traffic and 1:6 or flatter transversely. Close lanes to traffic when over 100 mm.
Lane lines or centerline	75-115 mm max	Use wedge with 1:1 or flatter slope.
	more than 115 mm	Use wedge with 1:3 or flatter slope.
Edge line or on shoulder	more than 500 mm	Provide a minimum 1-meter wide buffer and use wedge with 1:3 or flatter slope for overnight exposure.
	more than 1 meter	Provide a minimum 3-meter wide buffer and use wedge with 1:3 or flatter slope for overnight exposure or provide appropriate barrier separation.

**High Speed - 50 km/hr or more (30 mph)**

Location	Elevation Difference	Pavement Surface Edge Mitigation Recommended
All Surfaces	50 mm max	None (vertical edge allowed)
	Trenches over 50 mm (includes holes for utilities hookup)	Use steel plates to cover transverse openings or treat longitudinal trenches as drop-offs using wedges with 1:3 or flatter slopes.
	Protrusions (i.e., utility cover or manhole) up to 50mm max	Provide wedge around the protrusion with 1:12 slope or flatter in direction of traffic and 1:6 or flatter transversely. Close lane to traffic when over 50 mm.
Centerline between opposing traffic lanes	50-75 mm max	Use wedge with 1:1 or flatter slope.
	75-115 mm max	Use wedge with 1:3 or flatter slope.
	more than 115 mm	Do not allow. (use barrier separation)
Lane line or at edge line	50-75 mm max	Use wedge with 1:1 or flatter slope.
	75-115 mm max	Daylight (no nighttime exposure)- Use wedge with 1:1 or flatter slope. Nighttime - Use wedge with 1:3 or flatter slope.
	115-200 mm max	Use wedge with a 1:4 or flatter slope.
	more than 200 mm	Do not allow at lane line.
Outside of edge line (shoulder, etc)	50-115 mm max	Use wedge with 1:1 slope or flatter.
	115-200 mm max	Use wedge with 1:3 slope or flatter.
	200-500 mm max	Provide a minimum 1-meter wide buffer and use wedge with 1:4 or flatter slope for overnight exposure or provide appropriate barrier separation.
	more than 500 mm	Provide a minimum 3-meter wide buffer and use wedge with 1:4 or flatter slope for overnight exposure or provide appropriate barrier separation.